TVNZ

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29 June 1995

Robert Cooper
P O Box 330
Mangonui
Far North

Dear Mr Cooper

B-MAC Manual

Enclosed is a copy of the operators manual for the B-MAC decoder you have. We have not been supplied with any technical or maintenance manuals for this equipment by Scientific Atlanta. If you need further information on this equipment, you may need to approach Scientific Atlanta directly. Their address is on the first page of the manual.

Yours sincerely

Wayne Huggard
Technical Development Executive
TVNZ Satellite & Pacific Services

Wayne\Let168.doc

SERIES E9700

B-MAC COMMERCIAL DECODER

625-LINE SYSTEM

OPERATOR'S MANUAL

DIGITAL

a division of Scientific-Atlanta

SERIES E9700
B-MAC COMMERCIAL DECODER
625-LINE SYSTEM

OPERATOR'S MANUAL

DVS Part No. 707-286.

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Telephone: (416) 299-6888 Fax: (416) 299-7145 Telex: 065-25344

REVISION HISTORY

ISSUE	CHANGES
1 (01/90)	------
1B (02/90)	ECN 003-100.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert you to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

CAUTION

RISK OF ELECTRIC SHOCK DO NOT OPEN

The exclamation point within an equilateral triangle is intended to alert you to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

The above caution symbols are located on the top panel of the unit.

CAUTION

TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVERS FROM THIS UNIT. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL. SEE ADDITIONAL SAFETY INSTRUCTIONS BELOW.

WARNING

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.

IMPORTANT SAFEGUARDS

1. **Read Instructions** - All the safety and operating instructions should be read before this product is operated.

2. **Retain Instructions** - The safety and operating instructions should be retained for future reference.

3. **Heed Warnings** - All warnings on the product and in the operating instructions should be adhered to.

4. **Follow Instructions** - All operating and use instructions should be followed.

5. **Cleaning** - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

6. **Attachments** - Do not use attachments not recommended by Scientific-Atlanta as they may cause hazards.

7. **Water and Moisture** - Do not use this product near water - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.

8. **Accessories** - Do not place this product on an unstable cart, stand, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, bracket or table recommended by Scientific-Atlanta. Any mounting of the product should follow the instructions, and should use a mounting accessory recommended by Scientific-Atlanta.

8A. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

PORTABLE CART WARNING

9. **Ventilation** - Openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the instructions have been adhered to.

10. **Power Sources** - This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home or business, consult your appliance dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.

11. **Grounding** - This product is equipped with a 3-wire grounding-type plug, a plug having a third (grounding) pin. This plug is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding-type plug.

12. **Power-Cord Protection** - Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

13. **Lighting** - For added protection for this product during a lightning storm or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.

14. **Power Lines** - An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.

15. **Overloading** - Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

16. **Object and Liquid Entry** - Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

17. **Servicing** - Do not attempt to service this product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

18. **Damage Requiring Service** - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

    a. When the power-supply cord or plug is damaged.

    b. If liquid has been spilled, or objects have fallen into the product.

    c. If the product has been exposed to rain or water.

    d. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to its normal operation.

    e. If the product has been dropped or the cabinet has been damaged.

    f. When the product exhibits a distinct change in performance - this indicates a need for service.

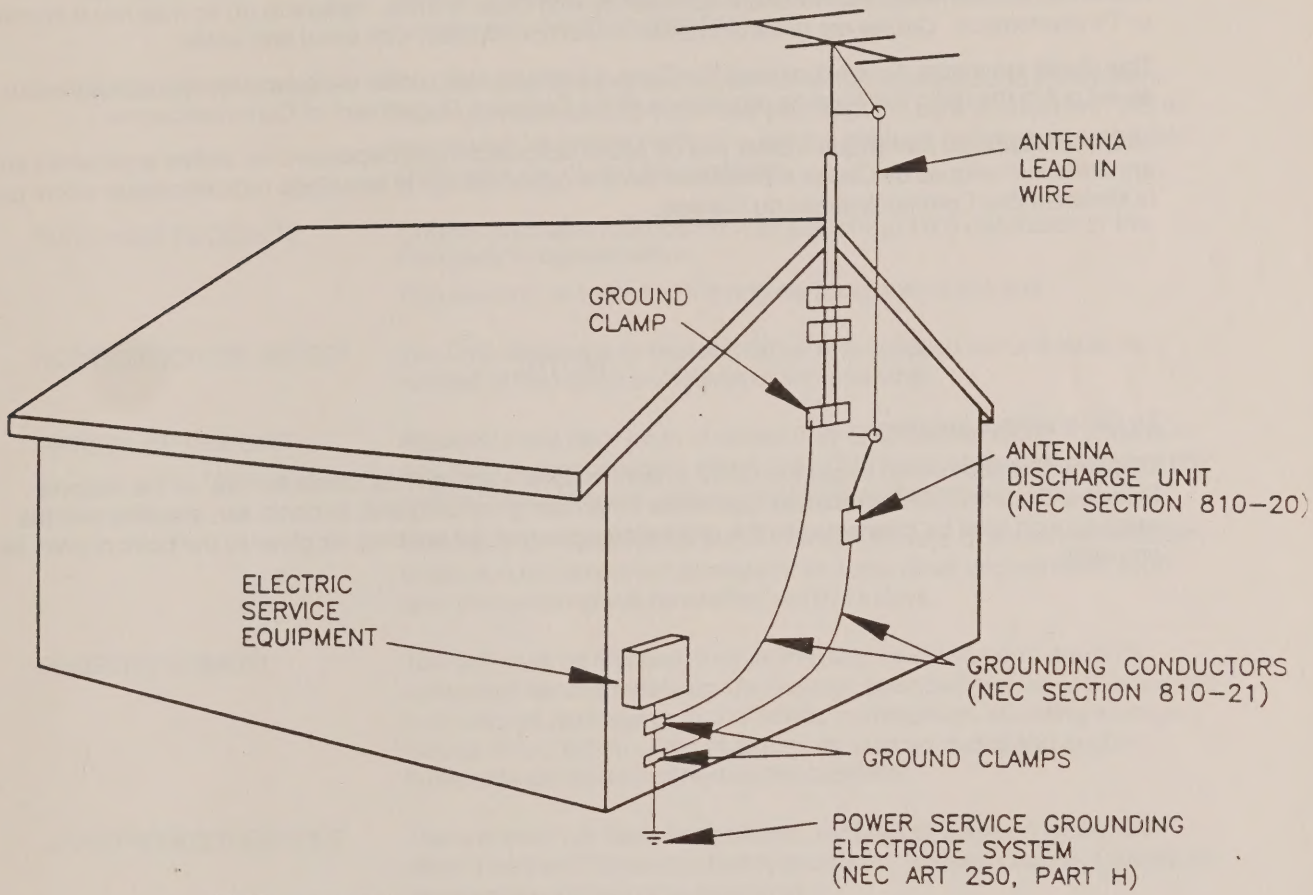
19. **Replacement Parts** - When replacement parts are required, be sure the service technician has used replacement parts specified by Scientific-Atlanta or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.

20. **Safety Check** - Upon completion of any service or repairs to this product, ask the service technician to perform safety checks to determine that the product is in safe operating condition.

21. **Outdoor Antenna Grounding** - If an outside antenna or cable system is connected to the product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See figure on the next page.

TEXT OF REVISED FIGURE 75.1 IN THE THIRD EDITION
OF THE STANDARD FOR LOW-VOLTAGE VIDEO PRODUCTS
WITHOUT CRT DISPLAYS, UL 1409

FIGURE 75.1
EXAMPLE OF ANTENNA GROUNDING



NEC - NATIONAL ELECTRICAL CODE

Revised Figure 75.1 effective October 1, 1990

WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to be in compliance with the limits for a Class A computing device pursuant to Subpart J Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Shielded cables should be used to interconnect this decoder with any peripheral equipment (e.g., video monitors, data terminals, etc) to insure compliance with Class A limits. Failure to do so may result in radio or TV interference. Cables are to be of braided shield construction with metal end shells.

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de Classe A prescrites dans le reglement sur le brouillage radioelectrique edicte par le Ministere des Communications du Canada.

NOTE

To CATV system installer:

This reminder is provided to call the CATV system installer's attention to Article 820-22[1] of the National Electrical Code (NEC) that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of entry as practical.

[1]The National Electrical Code 1987 Handbook published by the National Fire Protection Association, Fourth Edition, March 1987.

WARRANTY CONDITIONS

Digital Video Systems Corp., hereafter, DVS, warrants the Purchaser that each new unit is free of defects due to faulty material and/or workmanship and that it will be the quality designated and described by DVS.

TERMS OF WARRANTY

COVERAGE OF WARRANTY	Subject to the conditions set forth herein, DVS warrants that it will repair, replace or correct any part of the enclosed unit which proves defective by reason of faulty material and/or improper workmanship, or any non-conformance to the unit's specifications.
DURATION OF WARRANTY	The warranty for parts and labour for all defects related to component failure or workmanship is for one year from the date of shipment. No extension will be granted without a service contract between an authorized DVS repair depot and the customer.
PURCHASE REQUISITE	Original purchase must be from an authorized DVS distributor or the Company's representative. This warranty is limited to the original purchaser of the unit.
NOTIFICATION OF DEFECT	The DVS distributor or representative who supplied the unit must be notified of the defect in material or workmanship.
RETURN OF THE UNIT	Approval must have been obtained from DVS before return of the unit or any parts and accessories of the unit. DVS is not obligated to accept any unit or parts of the unit without prior DVS authorization. Units sent for repair will be shipped within 14 days of arrival at the factory. If not, due to component availability or some other uncontrolled problem, the customer will be notified within 14 days.
PROPER SHIPMENT	The unit must be shipped "Freight Prepaid" or delivered to any DVS authorized service facility (or the factory), provided that the unit is packed in its original package or that of similar construction, affording an equal degree of protection. Freight expenses, custom duties and custom brokerage are costs incurred by the customer.
UNAUTHORIZED SERVICE	The unit must not have been altered, repaired or serviced by anyone other than the DVS service facility located in Toronto, Ontario, Canada or the warranty will be considered void.
MISUSE, ACCIDENT, ABUSE, ETC.	The unit must not have been subjected to change, or alteration due to accident, failure caused by war or acts of God, misuse, improper maintenance, change of serial number, or operated contrary to the instructions contained in the instruction manual.

DVS reserves the right to make any improvements on its products or parts without assuming any obligation to install them in previously manufactured units. No liability is assumed by DVS for any collateral or consequential damages or losses associated with its product.

For any unit or subassembly returned for repairs under warranty conditions and found to have no fault(s), the customer will be charged for the time spent.

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Table of Contents

FIGURES

SECTION 1
GENERAL DESCRIPTION

1.1 INTRODUCTION

This operator's manual provides instructions for installing and operating the 625-line Series E9700 B-MAC Commercial Decoder. Since this is an operator's manual, no maintenance instructions or technical reference material (other than specifications) are included.

The commercial decoder (shown in figure 1.1) is a stand-alone unit that is for use in CATV, SMATV, and private networks. The decoder will, when authorized by an encrypted addressed data packet, descramble a composite baseband B-MAC signal from a separate receiver and convert the video into the PAL format. An RGB video output is provide, and up to six channels of Dolby adaptive delta-modulated audio are available. Teletext is available for captioning on the video, or as a separate output for informational displays. Up to five data channels are available for user applications. All of these services are secured against unauthorized reception: the video is secured by line-translation scrambling, and the audio, teletext and user data are secured by encryption.

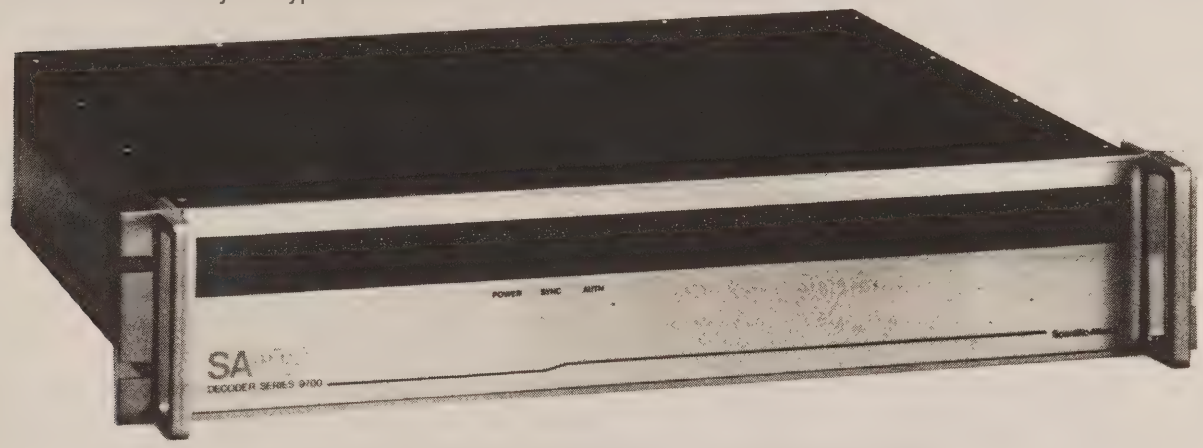


Figure 1.1. Series E9700 B-MAC Commercial Decoder

1.2 DECODER FEATURES

The Series E9700 Decoder is available as a basic model (suffix 'B' added to the model #) or with any combination of three optional features: teletext ('T' option), reassigned data outputs ('D' option), and audio expansion ('A' option). Table 1.2 contains a model/option matrix for the six PAL-compatible (625-line) option combinations.

Table 1.2. Model/Feature Matrix

Suffix	Teletext	Reassigned Data Outputs	No. of Audio Channels
B	NO	NO(2)	2+M(1)
BA	NO	NO(2)	6+M
BD	NO	YES	2+M(1)
BT	YES	NO(2)	2+M(1)
BTA	YES	NO(2)	6+M
BTD	YES	YES	2+M(1)
BTAD	YES	YES	6+M

Notes: 1. Factory upgradeable to 6+M by retrofitting Audio Expansion Card.
2. Factory upgradeable by retrofitting Data Expansion Card.

The following paragraphs describe the various features and functions that are currently available for the decoder models.

1.2.1 Composite Baseband Loopthrough

A rear panel BNC connector is provided which loops through the composite baseband input signal. In addition, a 75-ohm termination is provided for those situations where the loopthrough is not used.

1.2.2 Video Polarity Select Switch

Because the decoder may be used with high-side or low-side injection LNBs, the composite baseband input may be normal or inverted. A rear-panel slide switch allows the decoder to accept an input of either sense.

1.2.3 Control Lines

Four control line outputs are provided on a rear-panel 9-pin D-type connector. These lines are for remotely controlling equipment at the decoder location from the uplink location. The outputs are open-collector TTL, and in most cases require additional drive circuits (user provided) to interface your equipment.

1.2.4 Additional Audio Channels

Some models are supplied with two audio channels and a monaural output (combining the two channels) while other models are equipped with six audio channels, plus a monaural output. (The circuitry for these four additional channels is located on the Audio Expansion Card, and is available for factory upgrading.) The outputs are provided as 600 ohm balanced outputs.

1.2.5 RGB Outputs

On all models, RGB component video and composite sync outputs are provided on a Cenelec connector. The component video level is 700mV p-p into 75 ohms, and the composite sync level is 2.0V p-p into 75 ohms. A PAL output is also provided via the Cenelec connector, with an output level of 1.0V p-p into 75 ohms.

1.2.6 Utility Data Output

All models are provided with an output for the general purpose Utility Data channel, which will accept data rates of up to 9600 baud. This data is encrypted in the channel and has 5:1 majority logic error correction applied to it in the decoder. The output signal complies with EIA RS-423A, and the connector (9-pin D-type) complies with RS-449 for Data Circuit-Terminating Equipment.

1.2.7 Reassigned Data Outputs

Certain models are provided with four Reassigned Data outputs. This allows the decoder to output up to four channels of data to replace audio channels. The data is encrypted in the channel. Two of the outputs are error-corrected by 7:1 majority logic, and on these channels data rates of up to 19.2kB may be used. The other two channels have no error-correction perfomed on the data, and on these channels, the bit rate is $13f_H$, or approximately 204.5kB/s. A Data Clock is provided with the high-speed uncorrected data outputs, with the data valid at the rising edge of the clock. The output signals for the error-corrected channels comply with EIA RS-423A (unbalanced), while the uncorrected outputs comply with RS-422 (balanced). The connectors are 9-pin D type. The low-end models can be factory upgraded for Reas signed Data Outputs by installing the Data Expansion Card.

1.2.8 Teletext

Those models equipped with the Teletext option are provided with uplink-controllable teletext which can replace the output video (for full-screen text messages), or be inserted into the video for captioning. The standard B-MAC teletext screen features are provided: seven colors, double-height characters, flashing characters, and simple graphics. In addition, a separate teletext output is provided. Normally, when teletext is enabled, it appears at the outputs that usually carry video, as well as at the Separate Teletext output. When the decoder is set by the uplink to the Separate Teletext mode, teletext will appear only at the Separate Teletext output, and only video will appear at the other outputs.

1.2.9 Video/Audio Bypass

All models are provided with relays for automatic bypassing of the decoder in the absence of a B-MAC feed. In the bypass mode, one of the two composite video output is connected through the bypass relay to the Bypass Video input, and the three basic audio outputs (2 + M) are connected through the bypass relay to three Bypass Audio Input Channels. The other video outputs will be blanked, and the other audio outputs will be muted. The decoder will switch to bypass mode if line power is removed.

SECTION 2
SPECIFICATIONS

2.1 VIDEO INPUT SPECIFICATIONS

The video input to the decoder must be a non-clamped, non-de-emphasized composite baseband signal which meets the following specifications. These specifications are not necessarily minimums for operation of the decoder, but must be met in order for the decoder to achieve its video and audio specifications:

Input level	
Standard 700mV	±3dB (with 17.5MHz p-p deviation), see note 1.
Optional	500mV ±3dB.
Impedance	75 ohms, see note 2.
Required Frequency Response	15Hz - 8.0MHz.
Group Delay Variation	15nS p-p to 5MHz, see note 3.

Note 1: The input may be either of normal sense (increasing luminance with higher voltage), or inverted. An inverting switch is provided on the unit's rear panel.

Note 2: The decoder does not internally terminate the input signal, but a removeable termination is supplied for the loopthrough connector.

Note 3: A roofing filter is not required in the receiver, as one is included in the decoder.

The decoder has an internal de-emphasis network which can be disabled for use with receivers specifically designed for B-MAC service. This operation is to be performed at the factory or can be performed in the field by a qualified technician.

2.2 VIDEO OUTPUT SPECIFICATIONS

2.2.1 Composite Output

The composite output specifications are listed in table 2.2.1.

2.2.2 RGB Output

The RGB output specifications are listed in table 2.2.2.

2.3 AUDIO SPECIFICATIONS

Audio specifications are listed in table 2.3.

Specifications are subject to change without notice.

Table 2.2.1. Composite Output Specifications

PARAMETER	SPECIFICATION
Amplitude/Frequency Response Luminance channel	 -3dB at 5.0MHz. ±1.0dB, 500kHz to 4.0MHz.
50Hz Squarewave Distortion	4%K
2T Bar Response	3%K
2T Pulse Response	3%K
Chroma/Luma Gain, Colour Bars	±5%.
20T	+0, -10%.
Chroma/Luma Delay, 12-1/2T	50nS.
Differential Gain	4%.
Differential Phase	4°.
Chroma/Luma Intermodulation	4%.
Luminance Nonlinearity	4%.
Luminance S/N Ratio, weighted Idle channel with 4.2MHz luminance bandwidth	 55dB.
Chrominance S/N ratio, weighted	47dB.
Output Level	1.0V ±10%.

Table 2.2.2. RGB Output Specifications

PARAMETER	SPECIFICATION
Amplitude/Frequency Response Each Channel	 -3dB at 5.0MHz. ±0.6dB, 500kHz to 4.0MHz.
50Hz Squarewave Distortion	4%K
2T Bar Response	3%K
2T Pulse Response	3%K
Nonlinearity	4%.
Crosstalk	-30dB.
S/N Ratio, weighted Idle channel with 1MHz chrominance bandwidth	 54dB.
Output Level, Video	700mV ±10%.
Output Level, Sync	2.0V ±20%.

Table 2.3. Audio Output Specifications

PARAMETER	SPECIFICATION
Dynamic Range	75dB.
Frequency Response 0dBm output level, 30Hz to 15kHz ref	±1.5dB.
Total Harmonic Distortion (SINAD) 1kHz, 0dB	-46dBr (0.5%).
Intermodulation Distortion 60Hz and 70kHz tones, 4:1 ratio	-30dBr (3.0%).
Gain Variation, Long and short term	±1.0dB maximum.
Channel Separation at 1kHz	50dB minimum.
Interchannel Gain	0 ±2.0dB maximum.
Output Level	0dBm ±3dB typical, +12dBm full scale (clipping).

2.4 POWER REQUIREMENTS

Power requirements for the decoder are as follows:

Frequency	47Hz - 63Hz.
Input Voltage Nominal	120V or 240V AC (factory set, internally selectable).
Range	90V-132V AC or 215V-264V AC.
Power Consumption	50W.

WARNING

This unit must be connected to earth ground to ensure compliance with safety regulations. Also, this unit contains voltages dangerous to life and must only be serviced by qualified personnel.

2.5 ENVIRONMENTAL CONDITIONS

Operating Environment	0°C to 50°C (32°F to 122°F).
Nonoperating Environment	-20°C to 70°C (-4°F to 158°F).
Relative Humdity	5% to 95%.
Relative Humidity, Nonoperating	95% maximum at 50°C.

2.6 PHYSICAL CHARACTERISTICS

Physical characteristics for the decoder are as follows:

Dimensions	16.5 in. (41.9cm) wide by 3.5 in. (8.9cm) high by 15.5 in. (39.4cm) deep).
Weight	15 lb. (6.8kg)..

SECTION 3
INSTALLATION

3.1 UNPACKING AND INSPECTION

Upon receipt of the unit, check for signs of damage to the outer casing. If any signs of damage are evident, be sure to notify the carrier before accepting the consignment. Notify your DVS representative at once if there are any defects or damages.

The unit has been thoroughly adjusted and inspected, both electrically and mechanically, to meet all specifications listed.

NOTE

Please retain the original packing material in case the unit must be returned for repair. Damages incurred due to use of packing materials that do not meet S-A specifications will result in the customer being responsible for all shipping and repair charges.

3.2 MOUNTING

The decoder is enclosed in a metal chassis with an extruded front panel having attached die-cast handles and rack mounting ears. All models can be mounted into an EIA standard RS-310C 19-inch rack. The mounting ears are sufficiently rigid to support the unit without the use of shelf brackets. Mounting holes are provided to allow attachment of standard rack slide mechanisms.

Before installing the decoder, note that the unit operates in temperatures ranging from 0°C to 50°C, and relative humidity from 5% to 95%. Select a dry, well ventilated location with a minimum of dust and vibration for locating the unit. To allow for air circulation and attachment of the appropriate cables, leave sufficient clearance between the rear of the unit and any obstacle or wall. Clearance above and below the unit should be no less than 1.75" (a clearance of 3.5" is recommended). The decoder measures 16.5"W x 3.5"H x 15.5"D, allowing installation in standard consoles and 19" racks.

The front panel is covered with a protective film when shipped; be sure to remove this protective film before installing the unit.

3.3 REAR PANEL CONNECTIONS

Table 3.3 lists the decoder's rear panel connectors and figure 3.3 is an illustration of the rear panel. Install the appropriate cables to accommodate your specific system configuration to be used by referring to the referenced table and figure. The following paragraphs describe the configuration of each connector type.

WARNING

Shielded cables should be used to interconnect this decoder with any peripheral equipment (e.g., video monitors, data terminals, etc). Failure to do so may result in radio or TV interference.

Table 3.3. Rear Panel Controls and Connectors

FIG. 3.3 INDEX REF.	CONTROL/CONNECTOR	TYPE	FUNCTION/DESCRIPTION
1	POWER ON	Rocker	Used to turn on decoder.
2	FUSE	Holder	Houses fuse for overload protection.
3	RF OUT	F type	Not used.
4	OUT SELECT	Slide	Not used.
5	AUDIO EXPANSION	Terminal	Channel 3, 4, 5 and 6 audio outputs, all 600-ohm balanced (if decoder is fitted with Audio Expansion option).
6	REASSIGNED DATA	9-pin D	Outputs for reassigned data channels (if decoder is fitted with Data Expansion option). Outputs 1 and 2 are error-corrected, asynchronous (up to 9600 baud) channels (RS-423A compatible), and outputs 3 and 4 are synchronous 204kB channels (RS-422 compatible).
7	UTILITY DATA	9-pin D	Output for utility data channel, up to 9600 baud, RS-423A or RS-232 compatible.
8	RGB OUT	Cenelec	RGB, sync, PAL, and audio outputs to monitor.
9	MON OUT	BNC	PAL video output (not switched in bypass mode).
10	SEP TEXT	BNC	Teletext only output (if decoder is fitted with Teletext option).
11	VIDEO OUT	BNC	PAL video output of decoded B-MAC, for connection to a monitor. When the decoder is in bypass mode, the BYPASS IN signal is switched to this output.
12	BYPASS IN	BNC	PAL video input which is switched through an internal to the VIDEO OUT connector when the decoder is in bypass mode.
13	CONTROL OUTPUTS	9-pin D	Remote control outputs for control of auxilary equipment.
14	MAIN AUDIO	Terminal	Channel 1 and 2 audio out, combined mono audio out, and 3 channels bypass audio in, all 600-ohm balanced. The AUX terminal is used as the non-bypass source for the + side of MON OUT.
15	LOOP OUT	BNC	Loopthrough output of MAC IN, for connection to additional B-MAC decoders. If this output is not used, the supplied 75-ohm termination must be installed on this connector.
16	MAC IN	BNC	B-MAC Baseband input from receiver.
17	INPUT NORMAL/INVERT	Slide	Allows selection of either input switch sense.
18	AC LINE INPUT	IEC-320	Line Input, 120V or 240V AC (factory set), 47-63Hz, used with supplied line cord.

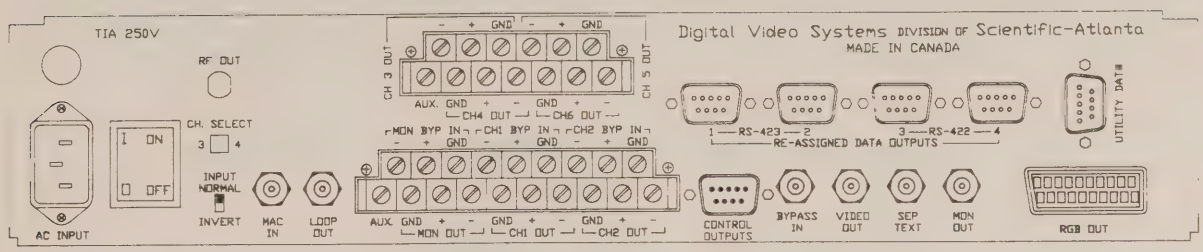


Figure 3.3. Rear Panel Layout

3.4 INPUT CONNECTOR CONFIGURATIONS

All input BNC connectors require no pinout explanation. Input and output pinouts for the MAIN AUDIO screw terminal strip are listed in table 3.4.

Table 3.4. MAIN AUDIO Screw Terminal Strip Pinout

PIN No.	FUNCTION/SIGNAL
1	Aux
2	Mono Bypass Input, Low Side
3	Ground
4	Mono Bypass Input, High Side
5	Mono Output, High Side
6	Ground
7	Mono Output, Low Side
8	Channel 1 Bypass Input, Low Side
9	Ground
10	Channel 1 Bypass Input, High Side
11	Channel 1 Output, High Side
12	Ground
13	Channel 1 Output, Low Side
14	Channel 2 Bypass Input, Low Side
15	Ground
16	Channel 2 Bypass Input, High Side
17	Channel 2 Output, High Side
18	Ground
19	Channel 2 Output, Low Side

See the note following table 3.5-1.

Connector Face

3.5 OUTPUT CONNECTOR CONFIGURATIONS

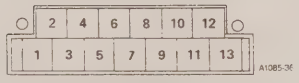
Output connectors consist of BNC, F, screw terminal strips, Cenelec, and D-type connectors. Only the screw terminal strips, Cenelec, and the D-type connectors are multi-pin devices that require pinout explanation; tables 3.5-1 through 3.5-5 identify and list the pinouts for these multi-pin devices.

Table 3.5-1. AUDIO EXPANSION Screw Terminal Strip Pinout

PIN No.	FUNCTION/SIGNAL
1	No Internal Connection
2	Channel 3 Output, Low Side
3	Ground
4	Channel 3 Output, High Side
5	Channel 4 Output, High Side
6	Ground
7	Channel 4 Output, Low Side
8	Channel 5 Output, Low Side
9	Ground
10	Channel 5 Output, High Side
11	Channel 6 Output, High Side
12	Ground
13	Channel 6 Output, Low Side

NOTE: The audio outputs are floating balanced lines. Therefore, neither the (+) or (-) outputs should be connected to ground. Unbalanced loads should be connected between ground and (-), or ground and (+).

Connector Face

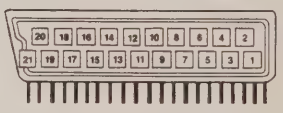


AUDIO EXPANSION TERMINAL STRIP

Table 3.5-2. RGB OUT Cenelec Connector Pinout

PIN No.	FUNCTION/SIGNAL	PIN No.	FUNCTION SIGNAL
1	Audio Out, Ch.2	12	Not Connected
2	Ground	13	Ground
3	Audio Out, Ch.1	14	Sync Out
4	Ground	15	Red Out
5	Ground	16	Not Connected
6	Not Connected	17	Ground
7	Blue Out	18	Not Connected
8	Monitor Enable	19	PAL Out
9	Ground	20	Not Connected
10	Not Connected	21	Shield Ground
11	Green Out		

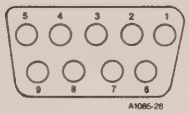
CONNECTOR FACE



A1085-47

Table 3.5-3. Reassigned Data Output Connector Pinout

The Reassigned Data outputs are provided at four separate 9-pin D-type connectors having female contacts/male shell, conforming to EIA RS-449. The two error-corrected outputs (1 and 2) are unbalanced RS-423 signals, with the following pinout:

PIN No.	FUNCTION	CONNECTOR FACE
1	Shield Ground	
2	Not Connected	
3	Not Connected	
4	RS-423 Data Out	
5	Signal Ground	
6	Not Connected	
7	Not Connected	
8	Not Connected	
9	Signal Ground	

The two uncorrected high-speed data outputs (3 and 4) are balanced RS-422 signals with a balanced data clock output. The pinout for these two connectors is as follows:

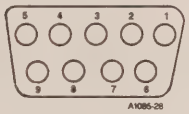
PIN No.	FUNCTION	CONNECTOR FACE
1	Shield Ground	
2	RS-422 Clock Out True	
3	Not Connected	
4	RS-422 Data Out True	
5	Signal Ground	
6	RS-422 Clock Out Complement	
7	Not Connected	
8	RS-422 Data Out Complement	
9	Signal Ground	

Table 3.5-4. CONTROL OUTPUTS Connector Pinout

The four Control Output lines are provided via a 9-pin D-type male connector. The outputs are open collector TTL. The maximum pullup voltage for these is 30.0V and the maximum low current is 40.0mA. These outputs are directly from a TTL device and as such are not protected against short circuits or inductive loads. The pinout for this connector is as follows:

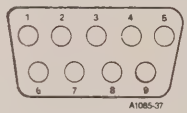
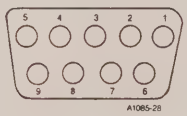
PIN No.	FUNCTION	CONNECTOR FACE
1	Output 1	
2	Output 2	
3	Output 3	
4	Output 4	
5	Valid MAC Complement	
6	Ground Return	
7	Ground Return	
8	Ground Return	
9	Ground Return (S.N. XXXXX0000000 to 199) +5V through 47 ohms (S.N. XXXXX0000200 & up)	

Table 3.5-5. Utility Data Output Connector Pinout

The RS-423 Utility Data channel output is provided via a 9-pin D-type female connector, conforming to EIA RS-449. The pinout for this connector is as follows:

PIN No.	FUNCTION	CONNECTOR FACE
1-3	Not connected	
4	RS-423 Data Output	
5	Signal Ground	
6-9	Not Connected	

3.6 RECEIVER-to-DECODER INTERCONNECTIONS

The Series E9700 Commercial Decoder is often used with the Scientific-Atlanta Model 9640 Receiver. This section describes and illustrates the interconnections between the decoder and this typical receiver. The two units are interconnected as shown in the following diagram.

If your system is equipped with a receiver from another manufacturer, make the corresponding connections ensuring that the receiver is set up as described in steps 7-9 below.

3.6.1 Interconnection Procedure

Connect the decoder to the receiver according to the step-by-step procedure below, referencing figure 3.6 in all steps.

Step

1. Connect the cable from the LNB to RF IN on the receiver.
2. Connect IF IN to IF OUT on the receiver, if not already connnected.
3. Connect COMP BB of the receiver to MAC IN of the ComDec.
4. Terminate LOOP OUT on the ComDec with 75 ohms, unless connecting to additional decoders.
5. Connect VID OUT of the receiver to BYPASS IN of the ComDec.
6. Connect screw terminals AUD 1 + and AUD 1- of the receiver to CH1 BYP.IN (white to -, black to +, and shield to GND) of the ComDec.

Receiver Setup

7. Switch AFC (Automatic Frequency Control) OFF.
8. Switch (de-emphasis) D-EMPH OFF.
9. Set VID to UNCLAMPED.

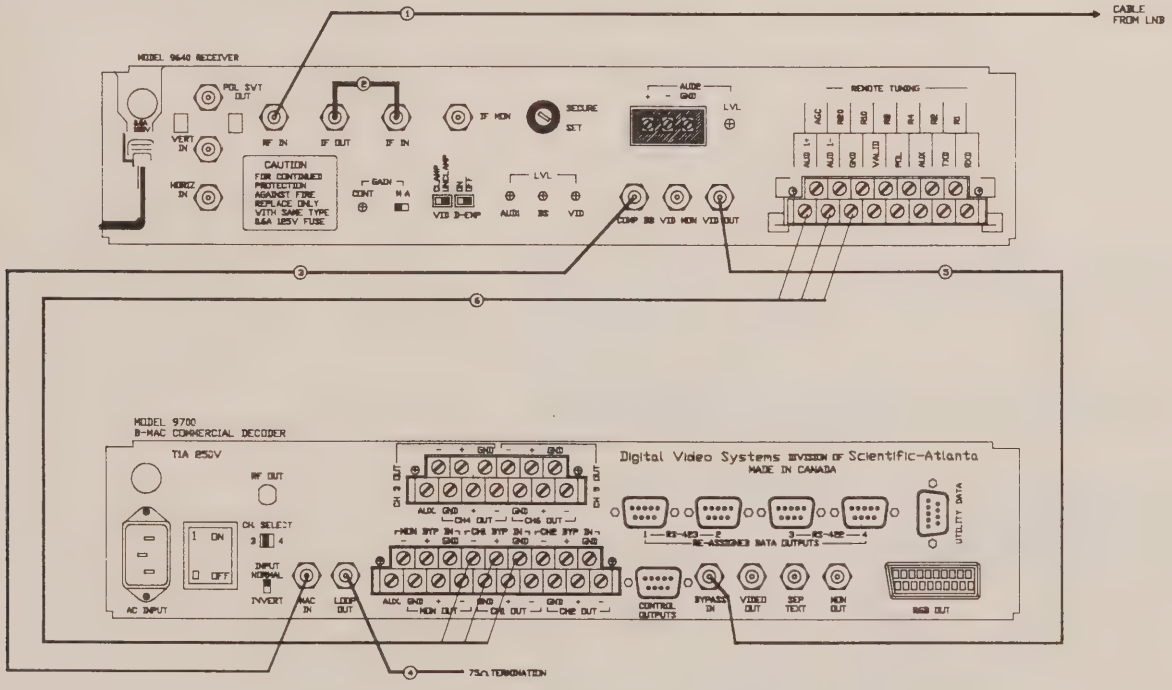


Figure 3.6. Receiver-to-Decoder Interconnections

SECTION 4
OPERATION

4.1 INTRODUCTION

The decoder requires no on-line operator attention other than an occasional glance at the front panel LEDs to check the status of the signals being processed. A front panel description follows.

4.2 FRONT PANEL DESCRIPTION

The decoder's front panel has no operator controls, but contains three LED indicators to inform you of the operating status. A description of each LED's function is given in table 4.2 and they are identified in figure 4.2.

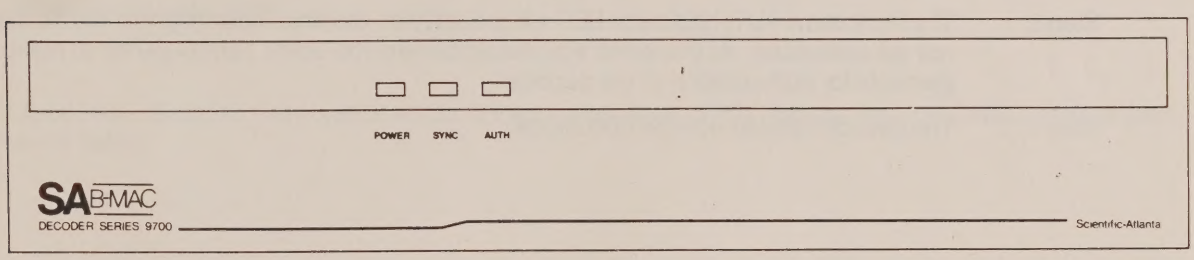


Figure 4.2. Front Panel View Showing Indicator Locations

Table 4.2. Function of Front Panel Indicators

INDICATOR	FUNCTION
POWER	This is a green LED that lights when line power is applied and the decoder's internal +5V power supply is providing the proper voltage.
SYNC	This is a green LED that lights when the decoder is receiving and is synchronized to a B-MAC signal. When this LED is not lit, the decoder is operating in the bypass mode.
AUTH	This is a green LED that lights when the decoder is receiving and correct ly descrambling a B-MAC encoded signal. If the decoder is not authorized, or if the received signal is seriously corrupted, the LED will flash and the video and audio outputs will be muted.

4.3 INITIAL SETUP AND POWERON PROCEDURE

If you have not already connected the appropriate cables, be sure to check the following:

- o Connect the decoder to a 120V or 240V AC (factory set), 47-63Hz power source.
- o Connect the MAC IN input of the decoder to the output of a suitable receiver. If the LOOP OUT output of the decoder is not used to feed additional decoders, then install the supplied 75-ohm termination.

Prior to using the decoder, perform the following functions:

Step 1. Check the setting of the rear panel INPUT NORM/INVERT slide switch. Set this switch for the video polarity that will be received. (If the satellite receiver is operating in KU band, the INPUT NORMAL/INVERT switch should be set to the INVERT position. If the receiver is operating in C band, then the switch should be set to the NORMAL position).

Step 2. Tune the receiver to a channel carrying a B-MAC signal.

Step 3. Turn ON the decoder by pressing the upper part of the rear panel POWER switch. Verify that the front panel POWER indicator LED turned on. If the LED did not light, shut off the POWER and check the rear panel AC line FUSE. If the fuse appears to be good, contact Digital Video Systems for service.

Step 4. Verify that the front panel SYNC indicator LED is lit.

Step 5. The front panel AUTH indicator LED will probably be flashing, indicating that the decoder is not yet authorized. At this point, you should contact the uplink control center to make arrangements for authorization of the decoder.

Step 6. The decoder should now be operational.

COMMENT SHEET

Manual Title: Series E9700 B-MAC Commercial Decoder Operator's Manual
625-line System

DVS Part Number: 707-286

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